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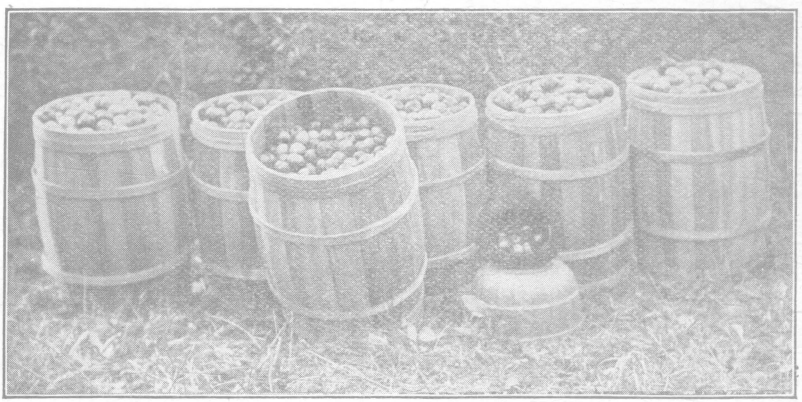
APPLE SPRAYING IN 1908

By H. A. GOSSARD

It seems desirable to set forth at this time a summary of the results we obtained in our spraying experiments last year. The orchard used for experiment, the property of Mr. John A. Stokes, consisted of 12 acres located near Fremont, Sandusky County. Four acres consisted of trees 24 years old, four acres of trees 20 years old and four acres of trees 12 years old. The three orchards contained 534 trees in all. Besides these were about two acres of scattering trees of various ages, not included in the experiment, but the returns from which are included in the report.

The harvest from two rows of Ben Davis barrelled between the rows.

The trees were planted 33 feet apart each way and, in the older orchards, averaged 30 feet tall with corresponding spread of limbs. The orchard had been regularly sprayed during previous years with a barrel outfit and a short while before our experiments were made was thoroughly sprayed with lime-sulfur wash. The buds were swelling when the lime-sulfur was applied and this treatment probably had a very beneficial effect on scab.



Wormy apples in hat.

Ben Davis tree sprayed twice.
1. Before bloom with Bordeaux.
2. Heavily with arsenate of lead, 3 lbs. to 50 gallons, soon after bloom fell.

Picked harvest:
Sound 4469.
Wormy 8.
.17 percent wormy.

Total harvest including drops.
Sound 4833.
Wormy 15.
.31 percent wormy.

The varieties were chiefly Baldwin and Ben Davis, but Stark, Winesap, Grimes Golden, King, Belmont, Bellflower, Fameuse, Rome Beauty, Walbridge, Pippins and a few others were represented. A few plots of Baldwin and Ben Davis were sprayed with Bordeaux mixture before blooming but most of the orchard received no treatment, except the spring application of lime-sulfur until after the petals fell. As soon as possible after the blossoms fell the entire orchard was given a heavy spraying with arsenate of lead alone, or with arsenate of lead combined with Bordeaux mixture. The Baldwins were several days advanced before spraying commenced but the Ben Davis were exactly right.

The spraying outfit consisted of a 1 1-2 horse-power gasoline engine, a 150 gallon tank and tower, mounted on trucks, and was easily drawn by one strong horse. The bamboo poles were 10 feet long, the one handled by the man on the tower being further

lengthened by a light brass extension about 3 feet long. A "goose-neck" or crook was used at the end of each rod to give a downward angle to the nozzle, thus directing the spray straight into the calyx cups. The man on the tower had a ring cluster of six Spramotor nozzles, while the man on the ground had two Mistry Jr., nozzles made by the Gould Co. The spraying capacity of this combination was about the equivalent of 10 Vermorel nozzles. From 100 to 125 pounds pressure was maintained and, with everything working in perfect order, the 150 gallon tank was emptied in approximately 40 minutes. The youngest orchard was sprayed first, the oldest next and the orchard 20 years old was left until the last. Where arsenate of lead was used alone for the first spraying, a second spraying with Bordeaux or lime-sulfur, or with Bordeaux and arsenate of lead combined, was given as soon as possible after the first application. We managed to work with the wind nearly all the time, and for the first spraying used about 20 gallons of spray per tree for the largest trees, and 10 to 15 gallons for the smallest or 12-year old trees. Some plots received a third spraying with arsenate of lead alone about the 20th of July.

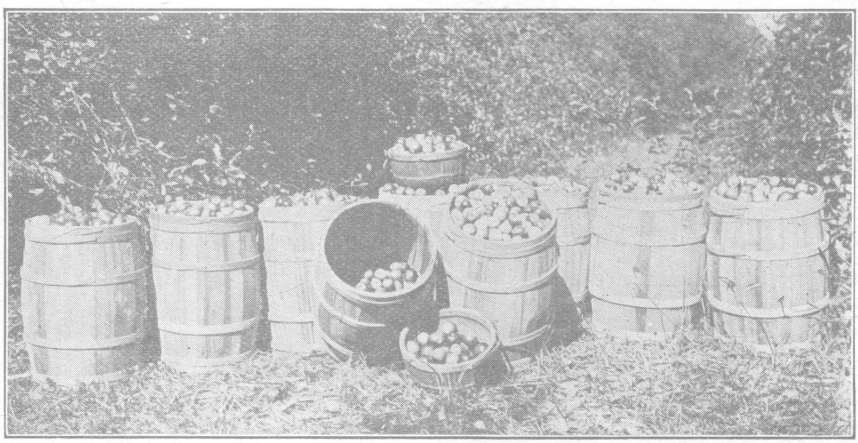
Wormy apples in basket on the ground.

Ben Davis tree sprayed once.
1. Heavily with Bordeaux and arsenate of lead, soon after bloom fell.

Picked harvest:
Sound 4987.
Wormy 54.
1.08 percent wormy.

Total harvest including drops:
Sound 5555.
Wormy 67.
1.2 percent wormy.

Although the young orchard was earliest sprayed and the young fruit was just at the right stage for spraying, more scab developed in this orchard than in the older orchards, which were later sprayed. Our Botanist says that it is the usual rule for the fruit from young trees to show more scabbiness than that from old ones. Those plots which received arsenate of lead alone without any fungicide for the first spraying and the check tree developed more scab than the plots which were heavily sprayed with Bordeaux, combined with poison, for the first spraying, but by harvest time very little scab was discernible on Baldwin, Ben Davis, Grimes Golden, or Stark, but the Winesaps, Pippins, Fameuse and a few others were quite scabby. The crop of Winesaps was light, owing to the falling of the young fruit almost as soon as it had set, due to scab disease. All the evidence suggests that in all probability better results would have been obtained by thoroughly spraying these susceptible varieties with Bordeaux before blooming.



Wormy apples in basket on the ground.

Ben Davis tree, sprayed twice.
1. Heavily with arsenate of lead just after bloom.
2. Bordeaux and arsenate of lead two or three weeks after 1. (3-4-3-50 formula.)

Picked harvest:
Sound 5604.
Wormy 55.
.97 percent wormy

Total harvest including drops:
Sound 6399.
Wormy 95.
1.46 percent wormy.

With the exception of a single plot of Ben Davis, no russeting of the fruit could be detected on any of the varieties, no matter how heavily they were sprayed nor when the applications were

made. A single row of Ben Davis sprayed very heavily with Bordeaux and arsenate of lead combined, when the fruit was very small, showed a little russeting, but from a practical standpoint the damage was well-nigh negligible.

Wormy apples in barrel at the right.

Ben Davis tree. Check. Not sprayed.

Picked harvest:
Sound 1240.
Wormy 633.
33.79 percent wormy.

Total harvest including drops:
Sound 1598.
Wormy 1180.
42.5 percent wormy.

Owing to the distance of the orchard from headquarters the drops were not picked up in the early part of the season, but all that could be found at harvest time, beneath the trees used for record, were collected and inspected for worms.

The best record obtained was from a Ben Davis tree sprayed with Bordeaux before bloom, and once heavily with arsenate of lead soon after the bloom fell. The following is its record:

Picked harvest.		Total crop including drops		Yield from tree	
Sound	4469.	Sound	4833.	Firsts	5 barrels.
Wormy	4.	Wormy	15.	Seconds	9-10 barrels.
Wormy	.17 percent.	Wormy	.31 percent.	Wormy	hatful.

The Ben Davis trees, if sprayed in good time, were estimated to be less than two percent wormy, including the drops, and the picked harvest was only a fraction of one percent wormy. The

Baldwins averaged one or two percent more wormy than the Ben Davis, owing to the fact that they were further advanced when sprayed. The third orchard of trees, 20 years old, which was sprayed about two weeks after the bloom fell, ran from 3 or 4 percent wormy on some trees, to 33 or 34 percent wormy on others. The only unsprayed check that was reserved yielded 42.5 percent wormy. So far as could be determined, the second and third sprayings with poison had so little effect in reducing the percentage of worminess that they did not pay for the cost of application.

Wormy apples in basket on the ground.

Baldwin tree sprayed three times.
1. Arsenate of lead just after bloom.
2. With lime-sulfur, two weeks later.
3. Arsenate of lead, 3-50, July 22-23.

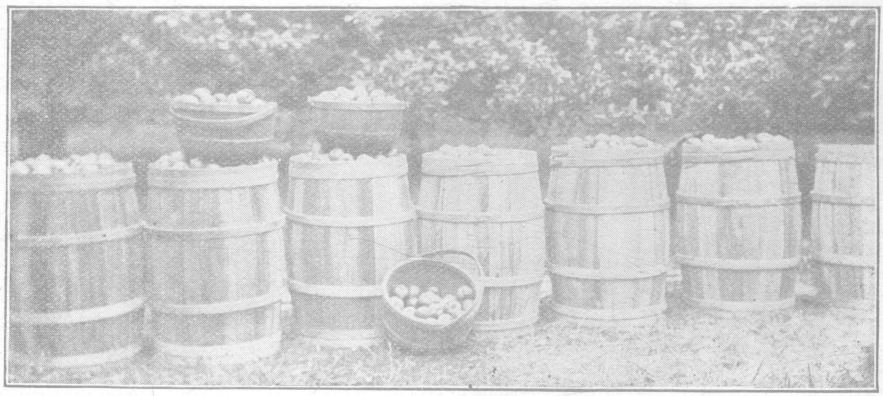
Picked harvest:
Sound 4541.
Wormy 58.
1.26 percent wormy.

Total harvest including drops:
Sound 6446.
Wormy 294.
4.36 percent wormy

THE RESULT AS A WHOLE

From the entire orchard of Mr. Stokes was gathered 1650 barrels of fruit, which sold at prices ranging from $3 to $5 per barrel. A carload of drops weighing 21,600 lbs. was sold in bulk at 65 cents per 100 lbs. From 200 to 300 bushels were sold locally as summer apples at the nearby towns, to neighbors, etc. The total income from the orchard for the season was approximately $7,400. It is safe to say that from $5,500 to $6,000 of this return was net and that the average net return per acre was between $400 and $500. From 55 Ben Davis trees, 24 years old, were picked 396 barrels of apples.Since these trees were 33 feet apart each way, 40 trees should be allowed per acre. The average yield per tree

was 7.2 barrels, or an acre, at this rate, yielded 288 barrels. On an average, seven-eighths of these, or 252 barrels, were classed as "firsts" and sold at $5 per barrel. One-eighth, or 36 barrels, were classed as "seconds" and sold for $3 per barrel. The value of the drops ran about $1 per tree. The total receipts, therefore, from this acre of orchard was $1,408, as closely as can be estimated. After making all allowances for care, spraying, trimming, harvesting, barreling and storing, the net profit exceeded $1,000 per acre, and this with only ordinary packages and methods of marketing.



Wormy apples in basket on the ground.

Baldwin tree sprayed three times.
1. Before bloom with Bordeaux.
2. Heavily with arsenate of lead after bloom fell.
3. Arsenate of lead, 3-50, July 22-23.

Picked harvest:
Sound 3565.
Wormy 45.
1.25 percent wormy.

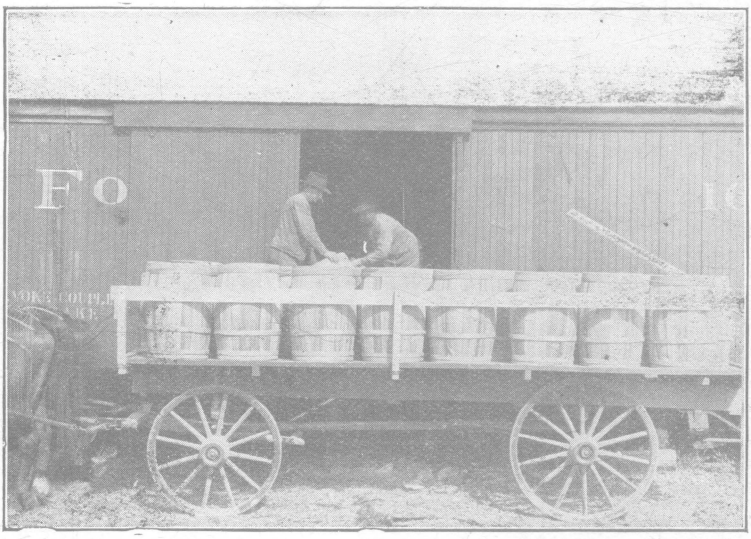
Total harvest including drops:
Sound 4272.
Wormy 86.
1.97 percent wormy.

We respectfully call the attention of our fruit growers to these results, and submit that they should carefully consider the possibilities of Ohio fruit production, before deciding that the far western states offer a more inviting or a more remumerative field for their activities.

ACKNOWLEDGEMENTS.

To Mr. J. A. Stokes, and to his son George, who operated the gasoline engine and assisted in all of the spraying, we express our thanks for most intelligent and effective help and cooperation.

About one-half of the work was done under the immediate direction of the writer, who held one of the nozzles, and the rest of it was entrusted to the care of Mr. Goodwin. The July spraying was made in charge of Mr. H. T. Osborn. Part of the negatives for the illustrations were made by Mr. Goodwin.



Loading car with apples to be shipped to Cleveland for putting in cold storage.